

8.23.2 Procedure for Beam Separator High Voltage Conditioning in Bldg. 919-B

1. Purpose

To provide instruction for the External Beam Group to conduct safe, temporary high voltage conditioning of the Beam Separators located in Bldg. 919-B.

2. Responsibility

- 2.1 Only the External Beam Group Operator or the External Beam Group Electrical Engineer can operate the high voltage power supply to the Beam Separators.
- 2.2 The External Beam Supervisor is responsible for the power supply when the separator is not being tested by maintaining LOTO of the Separator power supply switch.

3. Prerequisites

- 3.1 Beam Separator under vacuum ($P < 1 \times 10^{-6}$)
- 3.2 There shall be an operations log near the control racks at all times. All changes in operational status shall be recorded with time, date and responsible personnel.
- 3.3 All personnel in the area shall wear appropriate dosimetry.
- 3.4 The key to the test pit lock shall be kept with the operator and External Beam Group Electrical Engineer whenever the pit is opened.

4. Precautions

Note:

Operator must attach a red tag and lock on the 208 volt power switch per [BNL ESH Standard 1.5.1](#) before any personnel enter the pit or work on the power supplies. This switch is located upstairs on the east wall adjacent to the main door.

Warning

The peak radiation level near the separator during a high voltage spark may be as high as:
1000 mR/hr.

- 4.1. When voltages either across the separator gap or from a plate to ground exceed 10 kV, the separator may produce x-rays. The amount of radiation produced is a function of the separator voltage and current. The x-rays produced are negligible at low currents. The separator may spark at any time, however, and draw large currents. Therefore, the potential for radiation exposure is always present.

Warning

This is a VERY HIGH VOLTAGE SYSTEM (800 kV) and contact with cables and chassis should be kept to a minimum as a good operating practice.

- 4.2. All electrical hazards associated with the separators are isolated within grounded enclosures.
- 4.3 The voltage levels are as follows:
 - Separator 800,000 V dc Maximum
 - Control Cabinets 208 V/1 phase/60 Hz
 - Vacuum Pumps 208 V/1 phase/60 Hz
- 4.4 The staircase leading to the pit and the rear door to 919B shall be posted with flashing lights, H.V. warning signs, and radiation signs whenever the separator area is locked.
- 4.5 All personnel entering the separator area shall apply their own lock to the 208V power switch.

5. Procedure

- 5.1 The External Beam Supervisor shall designate an operator and a Sweep Team to perform the following:
 - 5.1.1 Sweep the separator pit making sure that barriers and radiation warning signs are in place and that the lights are flashing.
 - 5.1.2 Secure and lock the pit door and return the key to the Operator.
- 5.2 The Operator shall visually confirm that the pit is locked and inform the Supervisor that the separator is ready for energization.
- 5.3 The Supervisor shall remove the group red tag and lock from 208 volt power switch per [BNL ESH Standard 1.5.1.](#)
- 5.4 Application of High Voltage by Operator.
 - 5.4.1 The operator shall turn H.V. control knobs completely counter clockwise. Set control knobs to voltage or current mode depending on mode of operation.
 - 5.4.2 Turn on the power to each of the high voltage supplies. Press the H.V. ON buttons for both supplies (+ and -) for the separator that is to be tested.

- 5.4.3 Set the high voltage to the desired value by turning H.V. control knob clockwise.
- 5.4.4 Fill out separator log with appropriate data.
- 5.5 The Operator shall close the 208 volt power switch.
 - 5.5.1 Verify that vacuum pumps are on and valves are in the desired position for operation.
 - 5.5.2 Verify that the ion gauge controls are on and the base pressure on the separator is $< 1 \times 10^{-6}$.
- 5.6 Removal of High Voltage by Operator.
 - 5.6.1 Turn voltage down by running H.V. knobs on both supplies fully counter clockwise.
 - 5.6.2 Wait for high voltage to reduce to < 10 kV (approx. 1-2 min),
 - 5.6.3 Press the H.V. OFF buttons on both supplies.
 - 5.6.4 Turn the power off to each supply.
 - 5.6.5 Make appropriate entry into logbook.
- 5.7 Lock Out of power supplies
 - 5.7.1 The Operator shall open and LOTO the 208 volt power switch, per [BNL ESH Standard 1.5.1.](#)
 - 5.7.2 Inform the Supervisor so that the Supervisor can apply a group LOTO to the 208 V power switch.
 - 5.7.3 Give the key to the pit door lock to the Supervisor.
- 5.8 To enter pit area the Supervisor shall unlock the pit and direct all personnel that they shall place their own lock on the power switch before entering the pit.

6. **Documentation**

6.1 Separator Testing Area Logbook.

7. **References**

7.1 [BNL ESH Standard 1.5.1.](#)

8. **Attachments**

None.